AGH	**Katedra Robotyki i Mechatroniki**	KATEDRA ROBOTYKI I MECHATRONIKI AGH

GENETIC AND EVOLUTIONARY ALGORITHMS IN TECHNICS

Temat: Simple GA in MATLAB **- development**

Aim of classes: Development of simple GA in Matlab

Knowledge: structure of GA and decoding methods, Matlab functions.

Prowadzący: dr inż. Mariusz Gibiec	Termin: (Dzień i Godzina zajęć)	
Imię i nazwisko:	Data:	Uwagi:

According to the GA built during lab.1 schema (Fig.1) we are going to develop GA by using crossover and mutation probabilities. Also we are going to do some statistiscs of GA performance.

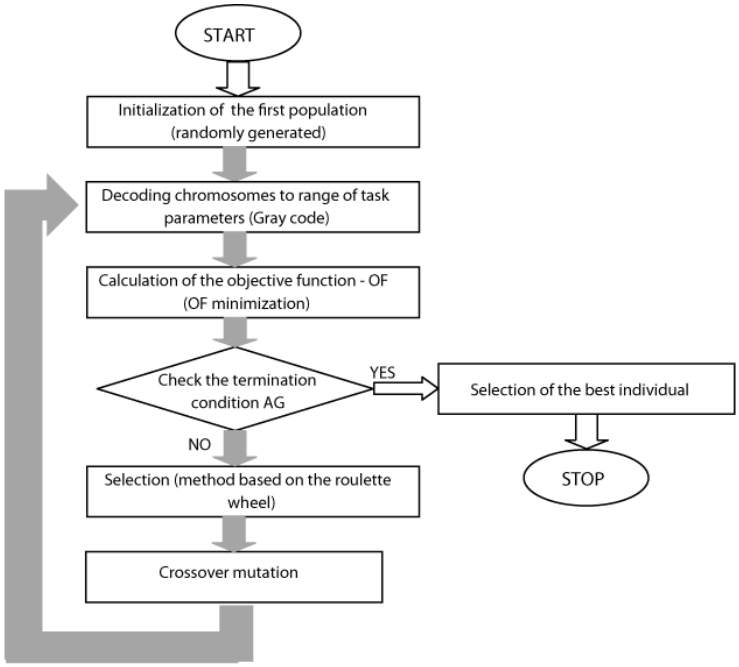

Fig.1 Schema of GA cycle

1. Define crossover and mutation probabilities

crossrate = muterate=

2. Crossover

After choosing mates for crossover check if they cross or not depending on random number compared with crossrate

3. Mutation

For each bit in new population check if it mutate or not the same way like in 2.

4. Statistics

Plesase assure saving number of done crossovers and mutations.

In each iteration (population) save also: sum of fitness values, mean and max fitness values

5. Decoding

To calculate values of fitness function of real arguments it is necessary to decode zero-ones string that is chromosome into real parameter.

Define cost (fitness) function $f(x)=x^{10}$, define its parameters to be optimized (number of arguments, range of optimization)

Decoding should be performed as mapping right to left by accumulating the current power of 2 when appropriate bit is set.

Calculated this way argument x should be normalized – the value divided by max value that can be coded in a chromosome of its length e.g. for length =30 max value is 2^{30}-1. It means the range of optimization of x is 0 to 1.

REPORT (send via e-mail: sprawozdania.mgi@gmail.com

Present results in row numbers (statistics) and plots of population fitness changes during evolution of individuals for both fitness functions. What is the result (x) for the real values function?